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(71) Applicant: **Grindsted Products A/S**  
**Edwin Rahrs Vej 38**  
**DK-8220 Brabrand(DK)**

(72) Inventor: **Meyer, Hans**  
**Farrevej 31**  
**Sjorring DK-8464 Galten(DK)**  
Inventor: **Bak, Aage**  
**Tornballevej 103**  
**DK-8381 Mundelstrup(DK)**

(74) Representative: **Vossius & Partner**  
**Siebertstrasse 4 P.O. Box 86 07 67**  
**D-8000 München 86(DE)**

(54) **A water-binding and gelatinising agent prepared from defatted pork rind and a process for its preparation.**

(57) **A water-binding and gelatinising agent is prepared thereby that defatted, comminuted pork rind having an approximate composition of 20% by weight of protein and 1% by weight of fat, the remainder being water, is comminuted and ground to a viscous, paste-like mass, which is dried on a drying surface at a temperature of from 100 to 190°C to a parchment-like film, which is ground to a powdered material containing 85-105% by weight of protein, 2-12% by weight of fat, 0.5-3% by weight of ashes and 2-12% by weight of water.**

**The agent is neutral in taste and bacteriologically stable.**

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**A water-binding and gelatinising agent prepared from defatted pork rind and a process for its preparation.**

The present invention relates to a novel water-binding and gelatinising agent prepared from defatted pork rind as well as a process for its preparation.

GB Patent Specification No. 1,420,960 discloses a dehydrated, bacteriologically stable pork rind product having a water content of less than 15% by weight, a fat content of less than 20% by weight and a particle size of less than 5 mm, the dehydrated rind being capable of rehydration into a rind product. The dehydrated pork rind product is manufactured by drying fresh port rind to the desired water content at between 100 -344°C with simultaneous removal of fat to the desired fat content, cooling and comminuting the product to the desired particle size, if necessary.

According to GB Patent Specification No. 1,420,960 the dehydrated rind product is substantially unable to gelatinise (i.e. form a gel) on subsequent rehydration. This means that on or after rehydration, substantially no gelatinisation will occur in any surrounding aqueous ambience. This is a consequence of the manufacture of the product.

The agent of the invention is obtainable from defatted pork rind by grinding the comminuted and possibly minced defatted pork rind, to which water and, if desired, edible salts may have been added, to a viscous, paste-like product, drying of the paste-like product on a heated drying surface at a temperature of from 100 to 190°C to a parchment-like film, removal of the parchment-like film from the drying surface and comminution and grinding of the parchment-like film to a powdered product. When no salts are added it contains 85-105% by weight of protein, 2-12% by weight of fat, 2-12% by weight of water and 0.5-3% by weight of ashes. The content of protein is determined by the content of nitrogen multiplied by 6.25.

The agent of the invention is preferably prepared from defatted pork rind having an approximate composition of 20% by weight of protein and 1% by weight of fat the remainder being water. The defatted pork rind being used as starting material in the preparation of the agent of the invention can be prepared as disclosed in US Patent Specification No. 2,748,152, e.g. by heating chopped rind together with water while liquefying the fat, separating the products and cleaning out the defatted pork rind by washing with water in centrifuges.

The process of the invention is characterized in that defatted pork rind having an approximate composition of 20% by weight of protein and 1% by weight of fat, the remainder being water, to which rind water and, if desired, edible salts, may have been added, is comminuted, possibly minced, whereafter the comminuted rind product is ground to a viscous, paste-like product, which is dried on a heated drying surface at a temperature of from 100 to 190°C to a parchment-like film, which is removed from the drying surface and comminuted and ground to a powdered product.

The process of the invention is easy and simple to carryout and provides a bacteriologically stable product being neutral in taste when no edible salts such as NaCl are added.

The agent of the invention possesses a number of advantageous properties making it applicable in a variety of products, e.g. snacks, animal feedstuffs, such as feedstuffs for dogs and cats, and processed meat products.

On account of its water-binding and gelatinising ability the agent of the invention can be used for the regulation of the consistency of various products, e.g. yoghurt, custard, mixtures for breeding, forcemeat, and cream of fish.

As the agent of the invention already at room temperature possesses unusual good water-binding and gelatinising ability the agent of the invention is therefore particularly suitable in fields of use, wherein heating would have a destroying effect, e.g. in the preparation of stabilized garlic extract, where the agent is acting as carrier, or in fields of use wherein the use of the agent does not aim at heating, e.g. instant powders for mousse, blancmange powders, powders for dressings and fishmeal.

Moreover, the agent of the invention may be subjected to a supplementary thermal treatment at temperatures of from 50° to 175°C whereby the immediate binding and gelatinising property by use in the cold is limited. Thereby a smaller increase of the viscosity by incorporation of the agent in the other ingredients is obtained. Upon heating of the finished mixture the water-binding and gelatinising effect is then released.

Carob flour is often used together with carrageenan in the preparation of sterilized feedstuffs for dogs and cats in order to provide a suitable consistency. This relatively expensive mixture can be replaced by the agent of the invention at a dosage of from 0.5 to 2% by weight.

Normally, polyphosphate is used to reduce the loss in weight due to cooking in meat and canned goods. Even if, today, polyphosphate is not considered as being injurious to health, there is a possibility that it will be forbidden in future. Moreover, the consumers express still stronger wishes that meat products are not allowed to contain artificial additives, and, thus, there is a need for an agent fulfilling the requirements made, such as the agent of the invention. When using the agent of the invention, the loss in weight due to cooking can be considerably reduced without the addition of phosphate.

Due to the water-binding properties and the ability to form a stable gel it is possible when using the agent of the invention in small amounts - from 0.3 to 0.5% - to enhance the consistency and cutting properties of various meat products considerably, e.g. hams, chopped ham and luncheon meat. When adding the agent of the invention in an amount of from 0.25 to 1% it is possible to prevent separation of liquid in vacuum packed sausages. Moreover, the gel strength is an important parameter in the preparation of form-pressed fish products, such as surimi being a known fish product in Japan and U.S.A. The addition of the agent of the invention enhances the consistency in the finished product considerably.

The agent of the invention possesses a surprisingly high gelatinising ability as compared to prior products. When tested according to British Standard 647:1969, TR 787, the agent of the invention forms a gel having a Bloom strength of 100 - 150.

Recently there has been a greatly increasing interest in preparing processed meat products and hereby also in obtaining an optimum exploitation of the more regular meat products as well as the meat by-products. When using the agent of the invention in an amount of from 0.5 to 2%, small pieces can be "glued" together, and, simultaneously, the consistency (texture) of the finished product can be enhanced. This applies to meat as well as fish products, e.g. chicken nuggets and fish fingers.

In the process of the invention the defatted, comminuted pork rind is ground to a viscous, paste-like product, which can be carried to the drying surface by means of a pump. The grinding of defatted, comminuted pork rind can be made in a colloidal mill. It may be necessary to carry out a mincing of the defatted pork rind prior to the grinding on the colloidal mill in order to obtain a ground product which can be pumped to the drying surface. A smaller amount of water and, if desired, edible salts may also be added.

The drying surface may be that of a drying drum, which is e.g. heated by means of steam or heated atmospheric air. The ground viscous, paste-like product is distributed on the drying surface in a suitable layer thickness and dried to a thin parchment-like layer, which is removed from the drying surface and processed to a powder of a suitable degree of fineness using the usual types of milling apparatus, dependent on the desired particle size of the finished product.

The agent of the invention is prepared from fresh defatted pork rind, and it possesses a composition and properties making it well-suited for use as a water-binding and gelatinising agent in the preparation of a broad variety of consumer products for human beings and animals.

The ground product is in the form of a fine powder. The powder is whitish, of a neutral taste and possesses a water-binding ability of > 1000%, calculated on the weight of the powder, at room temperature.

Typical assay values of the powder prepared without addition of edible salts are stated below:

Nitrogen (N) 15.2 % by weight  
Protein (N x 6.25) 95 % by weight  
Fat 5 % by weight  
Salt (NaCl) 0.5 % by weight  
Ash 1.0 % by weight  
Water 5 % by weight  
pH 7

The product of the invention is biologically stable, and upon analyzing no occurrence of *Escherichia coli*, *Salmonella* or *Clostridium* are found after 48 hours at 37°C.

Typically, the agent of the invention possesses the following amino acid composition, expressed in % of the protein content:

Cystin 0.3  
Aspartic acid 6.3  
Methionine 1.0  
Threonine 2.3  
Serine 3.1  
Glutamin acid 11.0  
Glycine 15.3  
Alanine 8.7  
Valine 2.5  
Iso-leucine 1.5

Leucine 2.7  
 Tyrosine 0.5  
 Phenylalanine 2.4  
 Histidine 2.9  
 5 Hydroxy-proline 10.3  
 Lysine 4.4  
 Arginine 7.3  
 Proline 11.5  
 Tryptophane <0.01

10 The agent of the invention has a long storage life and can be stored at room temperature in a dry environment for at least 12 months in the unopened packing.

The invention is further illustrated by means of the following Examples.

15 Example I

Defatted pork rind of a protein content of 20% and a fat content of 1% was taken out from the cold store (10°C) and minced in an ordinary household mincing machine. The minced rind product was ground in a colloidal mill (Fryma), whereby the temperature increased to 60 - 70°C. The ground rind product was a viscous paste, which was applied to the outer surface of a rotating drying drum by means of a monopump. 20 The surface of the drum was 0.7 m<sup>2</sup>. The application was made on the upper part of the drum, and the ground rind product was distributed on the drum by means of a system with 3 smaller rollers. The drying drum was heated by means of steam, the pressure of which may be varied up to 7 bars or more. When the drum had rotated three quarters turn, the dried and sterilised product was scraped off in the form of a parchment-like foil having a thickness of about 100 µm. The foil was chopped into pieces and subsequently 25 ground to a fine, free-flowing powder having a particle size of <0.5 mm.

Example II

30 Example I was repeated except that a saturated aqueous solution of NaCl was added to the batch. The ground powdery end product comprises 63% by weight of NaCl and 37% by weight of protein.

35 Example III

Evaluation of the water-binding ability in forcemeat

3.5 kg of trimmings (25% fat content), 0.125 kg of NaCl and 0.075 kg of powder prepared according to 40 Example I were mixed, and 3.0 kg of water were added. The mixture was processed in a high-speed mincing machine to forcemeat, which was filled into cans and either pasteurized (80°C for 1 hour) or sterilized (121°C for 1 hour). In a corresponding manner blank specimens were prepared, however without the addition of the powder prepared according to Example I. The separation of jelly in the forcemeat specimens was evaluated. The result is stated in the Table below.

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TABLE

<u>Forcemeat specimen</u>	<u>Separation of jelly in %</u>	
	<u>Pasteurized product</u>	<u>Sterilized product</u>
Blank specimen	3.2	7.1
In admixture with powder	1.7	2.7

Example IVEvaluation of the water-binding ability in forcemeat

3.5 kg of trimmings (25% fat content) and 0.200 kg of powder prepared according to Example II were mixed, and 3.0 kg of water were added. The mixture was processed in a high-speed mincing machine to forcemeat, which was filled into cans and either pasteurized (80°C for 1 hour) or sterilized (121°C for 1 hour). The separation of jelly in the forcemeat specimens was evaluated. The result is stated in the Table below.

TABLE

	<u>Pasteurized product</u>	<u>Sterilized product</u>
Separation of jelly in %	1.8	2.6

Example VEvaluation of gel properties

A 10% aqueous suspension of the powder prepared according to Example I was formed, and the suspension was heated to 75°C for 40 min., cooled to 20°C and left standing for 12 hours. A gel was formed, the strength of which was measured by means of a penetrometer. The results are given below.

10% gel

	<u>Ultimate strength (g/cm<sup>2</sup>)</u>	<u>Ultimate strain (mm)</u>
	>3000	None

A 10% aqueous suspension prepared as described above, however without heating, gives the following results:

	<u>Ultimate strength (g/cm<sup>2</sup>)</u>	<u>Ultimate strain (mm)</u>
	2620	10.5

Penetrometry: Height of specimen about 30 mm, the specimen was a cut out cylinder having a diameter of 8 mm, and the immersion rate was 1 mm/sec.

Example VIPreparation of chocolate mousse

- 5 A powdered mousse mixture consisting of topping powder, sugar, powdered skim-milk as well as flavour additives were admixed with about 9% of the powder prepared according to Example I. Cold water was added (150 ml to 70 g of powdered mixture), and the mixture was whipped. The mixture was left standing in a refrigerator, and it set after 30 min.

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## Ingredients:

- Topping powder 35.4%  
 Sugar 35.4%  
 15 Powder according to Example I 8.9%  
 Cocoa 7.1%  
 Powdered skim-milk 13.2%

20 **Claims**

1. A water binding and gelatinising agent obtainable from defatted pork rind by grinding the comminuted and possibly minced defatted pork rind, to which water and, if desired, edible salts may have been added, to a viscous, paste-like product, drying of the paste-like product on a heated drying surface at a  
 25 temperature of from 100 to 190°C to a parchment-like film, removal of the parchment-like film from the drying surface and comminution and grinding of the parchment-like film to a powdered product.

2. The water-binding and gelatinising agent of claim 1, characterized in that the defatted pork rind which is used for its preparation has an approximate composition of 20% by weight of protein and 1% by weight of fat, the remainder being water.

- 30 3. The water-binding and gelatinising agent of claim 1 or 2 characterized in that it contains 85-105% by weight of protein, 2-12% by weight of fat, 2-12% by weight of water and 0.5-3% by weight of ashes.

4. A process for the preparation of an agent as claimed in claims 1 to 3, characterized therein that defatted pork rind having an approximate composition of 20% by weight of protein and 1% by weight of fat, the remainder being water, to which rind water and, if desired, edible salts may have been added, is  
 35 comminuted, possibly minced, whereafter the comminuted rind product is ground to a viscous, paste-like product, which is dried on a heated drying surface at a temperature of from 100 to 190°C to a parchment-like film, which is removed from the drying surface and comminuted and ground to a powdered product.

5. The process as claimed in claim 4, characterized in that the drying surface is a drying drum, which is heated by steam.

- 40 6. The process as claimed in claims 4 or 5, characterized in that the product obtained is subjected to a supplementary thermal treatment at a temperature of from 50 to 175°C.

7. The use of the agent of any one of claims 1 to 3 for the preparation of food products, e.g. snacks, animal foodstuffs and processed meat products.

8. The use of the agent of anyone of claims 1 to 3 for the regulation of the consistency of food  
 45 products.

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(71) Applicant: **Grindsted Products A/S  
Edwin Rahrs Vej 38  
DK-8220 Brabrand(DK)**

(72) Inventor: **Meyer, Hans  
Farrevej 31  
Sjorring DK-8464 Galten(DK)  
Inventor: Bak, Aage  
Tornballevej 103  
DK-8381 Mundelstrup(DK)**

(74) Representative: **Vossius & Partner  
Siebertstrasse 4 P.O. Box 86 07 67  
D-8000 München 86(DE)**

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**The agent is neutral in taste and bacteriologically stable.**

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## EUROPEAN SEARCH REPORT

Application Number

EP 87 10 5456

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. CL4)
D,Y	LU-A- 68 129 (PROTEIN FOODS LTD) * Claims 1-6; example; page 4, lines 14-23; page 6, lines 7-33 * & GB-A-1 420 960 ---	1,3-5,7 -8	A 23 J 1/02 A 23 L 1/312 A 23 G 1/00
Y	GB-A-1 106 593 (AUDEL COLLOID CORP.) * Claims 1,7-13 * ---	1,3-5,7 -8	
D,A	US-A-2 748 152 (R.H. SIFFERD) * Claims 1-2; example 1 * -----	2	
			TECHNICAL FIELDS SEARCHED (Int. CL4)
			A 23 J A 23 L
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>02-12-1988</b>	Examiner <b>SANTOS Y DIAZ A.I.</b>
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			